

CYPERUS STEWARTII (CYPERACEAE), A NEW SPECIES FROM  
COCOS ISLAND, COSTA RICA

Gordon C. Tucker

Dept. of Biological Sciences  
Eastern Illinois University  
Charleston, Illinois 61920, U.S.A.  
gctucker@eiu.edu

ABSTRACT

**Cyperus stewartii** G.C. Tucker, sp. nov. is described. It is known from two collections from Cocos Island (Isla del Coco), Costa Rica, made in 1905. This species is most similar to *C. thyrsiflorus* and *C. lentiginosus*, species of the southern U.S., Caribbean slope of Mexico and Central America, and northern South America. It differs from both in its smaller anthers, shorter and narrower floral scales, closer spacing of scales on the rachilla, and very wide spacing of spikelets on the rachilla.

RESUMEN

Se describe **Cyperus stewartii** G.C. Tucker, sp. nov. Se conoce de dos muestras de la Isla del Coco, Costa Rica, colectadas en 1905. Esta especie es muy similar a *C. thyrsiflorus* y *C. lentiginosus*, especies del sur de EE.UU., vertiente del Caribe de México y América Central y el norte de América del Sur. Se diferencia de ambos en sus anteras pequeñas, escamas florales más cortas y más estrechas, escamas de la raquilla más densamente espaciadas, y una separación muy amplia entre las espiguillas sobre la raquilla.

KEY WORDS: Cocos Island, new species, *Cyperus*, Costa Rica, Central America

INTRODUCTION

The genus *Cyperus* L. includes about 690 species, occurring worldwide in warm temperate and tropical regions (Tucker 1994, 2001). The distribution of individual species ranges from cosmopolitan, e.g., *C. squarrosus* L. and *C. odoratus* L., to regional and narrow endemics found on all continents except Antarctica and Europe (Küenthall 1935–36). In the New World, areas of high diversity and endemism include the southeastern United States, Mexico, the Greater Antilles, and eastern Brazil (Tucker 2007.)

During the course of this study, and my preceding studies of the Mexican and Central American species of *Cyperus* (Tucker 1983, 1994), I have examined some 30,000 herbarium specimens from, or examined at, the herbaria listed in the acknowledgments. During my earlier studies of *Cyperus* in Costa Rica and Panama (Tucker 1983), I did not encounter any material of this new species. Then, in 2009, a single specimen was noted in a loan of unidentified *Cyperus* from US. I later contacted staff at CAS (California Academy of Sciences) who were able to locate two additional sheets of this species. Fortunately, between these three specimens, a complete description of the species can be made.

TAXONOMIC TREATMENT

**Cyperus stewartii** G.C. Tucker, sp. nov. (**Figs. 1, 2**). TYPE: COSTA RICA: ISLA DEL COCO: "Cocos Island, in low ground near Wafer Bay, California Academy of Sciences Expedition to Galapagos Islands," 5–7 Sep 1905, A. Stewart 268 (HOLOTYPE: CAS; ISOTYPE: US).

Affinis *Cyperus lentiginosus* et *Cyperus panamensis* sed differt in antherarum minor, squamae brevior angustiorique, in apice divertente, propius in rachillarum, et spicularum laxae subsequentes intervallent.

Plants perennial (?), 15–29 cm tall. Rhizome short, 2–3 mm long. Culms 0.7–2.3 mm in diameter, trigonous, smooth. Leaves 2–3, 6–20 cm long, 1.3–2.8 mm wide, inversely w-shaped, the margins scabrellate. Inflorescence bracts 4–6, 4–20 cm long, 0.5–3 mm wide, inversely w-shaped, the margins ciliate-scabrellate, ascendent at 30–45°. Rays 4–8, 1–6 cm long; prophylls 4–8 mm long, truncate. Spikes (10–)18–34 mm long, (12–)18–30



FIG. 1. *Cyperus stewartii*: inflorescence (from isotype, A. Stewart 268, US).

mm wide, loosely ovoid to oblong-ellipsoid; rachis 5–10 mm long (spikelets widely spaced, ca. 6–10 spikelets/cm). Spikelets (7–)10–30, 11–16 mm long, 1.6–1.8 mm wide, linear-lanceolate, compressed; rachilla deciduous, ca. 0.3 mm wide and 0.1 mm thick, flexuous, green, the wings ca. 0.3 mm wide, hyaline, successive scales 2 mm apart. Floral scales persistent, spreading, 6–12, 3.2 mm long, 1.5 mm wide, ellipsoid, subacute, entire to



FIG. 2. *Cyperus stewartii*: habit; (from holotype, A. Stewart 268, CAS).

TABLE 1. Comparison of *Cyperus stewartii* with *C. panamensis* and *C. lentiginosus*.

	<i>Cyperus panamensis</i>	<i>Cyperus stewartii</i>	<i>Cyperus lentiginosus</i>
Distribution	Pacific coast, Sinaloa to Ecuador	Cocos Island, Costa Rica	Caribbean lowlands, Texas to Venezuela
Spikelet density (# per cm of rachis)	22–34	6–10	20–28
Separation of scales along rachilla (mm)	4–5.6	2.5–3	(2.2–)2.6–3.4
Scale shape	Involute	ConduPLICATE	ConduPLICATE
Scale apex	Appressed, cuspidate to mucronulate	Spreading, entire	Appressed, mucronate
Scale color	light brown to golden brown, medially green	silvery-white, reddish toward center, medially green	off-white to stramineous, red speckled, medially green
Anther length (mm)	0.4–0.7	0.3–0.35	0.5–0.8(–1.4)
Achene length (mm)	2.0–2.8 × 0.8–0.9	1.7–2 × 0.5–0.65	1.7–2.0 × 0.6–0.7

mucronulate, laterally 3–4 nerved, silvery-white, reddish toward center, medially green, 3-nerved. Stamens 3; filaments 2.5 mm long; anthers 0.3–0.35 mm long, oblong to ellipsoid, the connective apex not prolonged. Styles 0.8–1.0 mm long; stigmas 3, ca. 1.0 mm long. Achenes 1.7–2 mm long, 0.5–0.65 mm wide, trigonous, oblong-ellipsoid, the apex rounded, apiculate from the dark purple style base, sessile to substipitate, the adaxial face convex, the abaxial flat, the surface papillose, light brown.

**Additional specimen:** **Costa Rica:** Cocos Island, in low ground near Wafer Bay, California Academy of Sciences Expedition to Galapagos Islands, 5–7 Sep 1905, A. Stewart 267 (CAS).

This new species is endemic to Cocos Island (Isla del Coco), in the Pacific Ocean about 400 km W of Costa Rica. It is most similar to *C. panamensis* (Britton) Standl. and *C. lentiginosus* Millsp. & Chase, species of Mexico and Central America, and northern South America (Table 1). It differs from both in its smaller anthers, and very wide spacing of spikelets on the rachilla; additionally the scales of *C. stewartii* are strongly spreading. In general appearance, it is also suggestive of *C. tenuis*, a widespread lowland species of southern Central America, the Caribbean, and northern South America; it has been recorded from Isla del Coco (Tucker 1983); however, *C. tenuis* has longer anthers, and much more densely arranged spikelets, typically 25 per cm of rachis. The holotype was identified in 2002 as "*Cyperus sphacelatus*." However, that pantropical species has annual habit, larger achenes, deciduous floral scales with a large purple spot on each side, and a flexuous, persistent rachilla.

The narrow range and few collections of *Cyperus stewartii* indicate need for conservation. The type collection was made in September. The three available sheets include both flowering and fruiting individuals.

**Etymology.**—This new species is named for Alban N. Stewart (1875–1940), botanist of the 1905–1906 CAS expedition to the Galapagos Islands, which also visited Cocos Island.

Cocos Island is located in the eastern Pacific Ocean at 5.526°N 87.066°W. The flora consists of 235 vascular plants, of which about 30% are endemic (Trusty et al. 2006). Thus far, only one other endemic of the Cyperaceae has been described from Isla del Coco, *Kyllinga nudiceps* Standl. [*Cyperus nudiceps* (C.B. Clarke ex Standl.) O'Neill] (Tucker 1984). Trusty and colleagues visited Isla del Coco several times. They reported five species of *Cyperus*: *C. aggregatus*, *C. hermaphroditus*, *C. ligularis*, *C. odoratus*, and *C. tenuis*. I have borrowed and examined specimens deposited at FTG. All were correctly identified with the exception of *C. hermaphroditus*, which proved to be *C. tenuis* as well. Another collection of *C. hermaphroditus* (Snodgrass & Heller 946, GH, cited by Trusty et al. 2006), proved to be *C. tenuis* as well. Other than the specimens collected by Stewart in 1905, this newly described species seems to have never been collected again.

#### ACKNOWLEDGMENTS

The work was completed during sabbatical leave. I am grateful to curators (Debra Trock, Bruce Bartholomew) and library staff at CAS (Rebecca Morrin, Christina Fidler) for locating additional specimens and for providing copies of Alban Stewart's field notes from his visit to Cocos Island, staff at Harvard University Herbaria (An-

thony Brach, Kanchi Gandhi, and Emily Wood) for searching for specimens, the Missouri Botanical Garden Library for access to literature, and to Barry Hammel for information on locations of Cyperaceae specimens from Isla del Coco. I appreciate reviews of an earlier draft by Barry Hammel and Barney Lipscomb. Thanks are extended to curators at the herbaria from which specimens were borrowed or examined for my ongoing studies of Neotropical *Cyperus*: AAU, AC, ARIZ, ASU, B, BA, BD, BKL, BH, BM, BR, C, CAS, CGE, CHAPA, CLEMS, CONN, CORD, CU, DAO, DAV, DS, DUKE, E, ECON, ENCB, EIU, F, FLAS, FTG, G, GH, ILL, ILLS, IND, JE, K, LCU, LL, M, MASS, MO, MSC, MT, MTMG, NHA, NY, NYS, P, PENN, PH, PMA, POM, PR, PRC, RSA, S, SD, SIU, SMU, SP, TCD, TEX, TRT, UC, UCR, UEC, US, UTEP, VT, WIS, WRSL, WVA, YU, and Z.

## REFERENCES

- KÜKENTHAL, G. 1935–36. Cyperaceae-Scirpoideae-Cypereae. In: A. Engler, ed. Das Pflanzenreich IV. 20 (Heft 101):1–671.
- TRUSTY, J.L., H.C. KESLER, & G. HAUG-DELGADO. 2006. Vascular flora of Isla del Coco, Costa Rica. Proc. Calif. Acad. Sci. (4th Ser.) 57:247–355.
- TUCKER, G.C. 1983. The taxonomy of *Cyperus* (Cyperaceae) in Costa Rica and Panama. Syst. Bot. Monogr. 2:1–85.
- TUCKER, G.C. 1994. Revision of the Mexican species of *Cyperus* L. (Cyperaceae). Syst. Bot. Monogr. 43:1–213.
- TUCKER, G.C. 2001. *Cyperus* (Cyperaceae). In: W.D. Stevens, C.U. Ulloa, A. Pool, O.M. Montiel, A.L. Arbalaez, D.M. Cutaia, and V.C. Hollowell, eds. Flora de Nicaragua. Missouri Botanical Garden, St. Louis, Missouri, USA. 1:740–757.
- TUCKER, G.C. 2007. Systematics of *Cyperus* L. section *Diffusi* Kunth (Cyperaceae) in the Neotropics. In: L.M. Barbosa and N.A. Dos Santos, Jr., eds. A Botânica no Brasil: pesquisa, ensino e políticas públicas ambientais. Sociedade Botânica do Brasil, Sao Paulo, Brasil. Pp. 311–314.